

# Breast feeding and HIV Transmission- an Overview of Delhi NCR Hospitals

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## ABSTRACT

*The HIV epidemic is showing a shift towards women and young people in the developing countries. The increasing HIV prevalence among women will show an increase in mother-to-child transmission (MTCT) of HIV. However, there is a wide difference in the rates of MTCT of HIV between developing countries. This difference is mainly attributable to different infant feeding practices in such countries. Further, about one to two-third of the overall vertical transmission rate is putative to peripartum period, depending on whether breastfeeding occurs or not. Thus, the periods of peripartum and breastfeeding have received a thrust of attention in the efforts to prevent vertical transmission of HIV. The review*

*paper addresses recent advances in our understanding of mother-to-child transmission risk factors, including maternal viral load (in plasma, genital tract and breast milk) and gender, and determinants and rates of postnatal transmission. The paper documents a thorough review to address the difficult dilemma of infant feeding by HIV+ mothers and the subsequent HIV-associated mortality. Further, a review of the records of 211 HIV+ mothers from six different hospitals of Delhi NCR is undertaken to supplement the core review.*

**Keyword:** Breast-feeding, AIDS in India, HIV, PTCT, Vertical Transmission, WHO

## INTRODUCTION

Transmission of HIV from infected HIV positive mother to her child is called as Vertical transmission. The transmission can occur during pregnancy, labor delivery or even breastfeeding. In the absence of any intervention, rates of MTCT of HIV-1 can vary from 15 to 30 per cent in developed countries and can reach as high as 30 to 45 per cent in developing countries. Nevertheless, the rates of vertical transmission can radically be brought down to as low as 5%. According to a recent report, about 90% HIV positive children worldwide have acquired the infection from mother through vertical transmission [1]. In India, about 28 million deliveries occur annually, of which 84,000 deliveries would occur in HIV-positive women considering a national average of 0.3 per cent

prevalence of HIV in pregnant women [1]. Without any intervention, about 30-45 per cent of these babies will become infected with HIV [1]. In the high prevalence states of Maharashtra, Tamil Nadu, Andhra Pradesh, Karnataka, Manipur and Nagaland, with more than 1 per cent HIV prevalence amongst pregnant women, there could be a much higher number of vertically infected babies being born annually [1].

## EFFICACY OF TRANSMISSION

MTCT is by far the most significant route of transmission of HIV infection in children below the age of 15 yr. This can occur during pregnancy especially in the last trimester, during delivery, and postnatal during breastfeeding. The foetus can get

infected *in utero* through maternal blood, transplacental haemorrhage, and infection via umbilical cord or via the gastrointestinal mucosa while swallowing infected amniotic fluid. Contact with the mother's blood and/or secretions during labour and delivery increases the risk of transmission. "Of the 30% of babies who get infected vertically, the relative frequency of timing of transmission is said to be as follows " 02 per cent early in gestation, 3 per cent late in gestation, 15 per cent during labour, 05 per cent in early postpartum period, and 5 per cent in late postpartum period"[2]. In the absence of any intervention, rates of MTCT of HIV-1 can vary from 15 to 30 per cent in developed countries and can reach as high as 30 to 45 per cent in developing countries [2]. This difference can mainly be attributed to infant feeding practices in the developing world that comprise almost universally of breastfeeds for prolonged duration [3].

#### **FACTORS AFFECTING TRANSMISSION**

Maternal factors like sero-conversion during pregnancy, advanced stage of the disease, concomitant malnutrition, "sexually transmitted diseases" in the mother and poor adherence to antiretroviral therapy after initiation are some important factors which increase the transmission during the antenatal period. As far as transmission in the intranatal period is concerned, factors like "vaginal delivery, prolonged contact with maternal blood and cervicovaginal secretions, prolonged rupture of membranes, chorioamnionitis, exposure to maternal blood like instrumentation during delivery, episiotomy, foetal scalp electrode" are associated with increased risk of transmission [4]. Further, there is a probability of transmission from thin skin, susceptible mucous membranes, immature immune functions and low levels of maternal antibodies in the premature infant etc. [4]. In the postnatal period "breast feeding, feeding in the presence of cracked nipples or mastitis, feeding by both breast feeds and top feeds, continuation of breastfeeds for prolonged periods of time, seroconversion of the mother during postnatal period, high viral load, low CD4 cell count, all increase the risk of transmission of HIV [5]. Prolonged breastfeeding continues to expose the child to HIV, and estimates of the additional risk of infection after three months (known as late postnatal transmission) are considerably high. To ensure large scale implementation, adequate measures are devised and revised from time to time by various concerned

agencies to address each of the above potential source of vertical transmission ( Refer: UNAIDS, UNICEF and WHO: Various Phases of Prevention 2010).

Based on Programme data, unprotected sex (87.4% heterosexual and 1.3% homosexual) is the major route of HIV transmission, followed by transmission from Parent to Child (5.4%) and use of infected blood and blood products (1.0%). In India, Injecting Drug Use is the predominant route of transmission in north eastern states, it accounts for 1.6 percent of HIV infections [6]. INSERT TABLE 1 HERE

#### **RATIONALE OF THE STUDY**

Apart from posing the burden of HIV positive children on the society, mother to child transmission (MTCT) is causing a great social problem by producing orphans after the death of one or both parents due to AIDS.

The PPTCT (prevention of parent to child transmission) programme entails counselling and testing of pregnant women in the ICTCs. The PPTCT interventions besides transitioning to multi-drug anti retro viral prophylaxis have also heavily emphasized over the role of peripartum and breastfeeding practices to efficiently bring down the transmission of HIV from mother to Child to the level of less than 5%. Government of India is now vigorously following the option "B" of the WHO recommendation with respect to the use of multidrug ARV Prophylaxis and PTCT counseling and breastfeeding guidelines [1]. [New WHO Guidelines 2013]

#### **LITERATURE REVIEW**

The Infant feeding options pose a difficult dilemma: longer breast-feeding may increase MTCT of HIV and subsequent HIV-associated mortality, but shorter breast-feeding (or no breast-feeding) may increase mortality from common childhood illnesses. Finally, HIV-exposed but uninfected infants, who represent 30% of all children born in some areas of southern Africa, have higher mortality rates than do infants born to HIV-uninfected mothers, even when feeding patterns are similar [5].

In this issue of Clinical Infectious Diseases, Kuhnet et. al provide important data regarding the duration of breast-feeding for HIV-exposed but uninfected infants in Zambia. This was a new analysis from the Zambia Exclusive Breast-Feeding Study, which previously

demonstrated no benefit of early weaning for HIV-free survival. In the current analysis, a cumulative mortality rate of 13.6% is reported among 749 HIV-uninfected infants who were followed up for 1–24 months. At each interval studied through 18 months of age, weaning from breast milk was associated with a significantly higher risk of infant mortality than was continued breast-feeding beyond 18 months. The authors call our attention to one of the most important and modifiable risk factors for infant mortality—early weaning from breast-feeding. Unfortunately, this particular risk factor may also lead to late MTCT of HIV, and balancing these risks is a difficult task that requires knowledge of the local infant mortality rate [5]. A striking message from this study is that the infant mortality rate is far too high. In a setting where >13% of HIV-uninfected infants died between 1 and 24 months of age and an additional 4% died in the first month of life, addressing the MTCT problem alone is clearly insufficient. These findings are generally consistent with those of other large studies that have demonstrated that a high mortality rate is, in part, related to HIV exposure: the 2-year mortality rate was at least 3-fold higher in Zimbabwe and 2-fold higher in Uganda among HIV-uninfected infants born to HIV-infected mothers, compared with that among infants born to HIV-uninfected mothers. The vulnerability of these HIV-exposed uninfected infants has been recognized for many years, but its cause remains elusive [7]. Early investigators hypothesized that HIV-infected women may not be able to care for their infants as well as uninfected women. However, the consistently higher mortality rates among HIV-exposed infants across locations and maternal CD4<sup>+</sup> cell counts, as well as the presence of risk even where maternal highly active antiretroviral therapy is available, suggest an immunologic or nutritional explanation. Breast milk quality is an obvious starting point, but initial attempts to find interpretable differences between the breast milk of HIV-infected and uninfected women have been unrevealing. Furthermore, the results of the current study and others suggest that, “even if the breast milk of HIV-infected women has some deficiencies, breast-feeding remains one of the cornerstones of mortality prevention” [8].

Interventions that allow for longer periods of safe breast-feeding are an important first step, but additional measures to reduce infant mortality both before and after weaning are needed [9].

In the end, to fully address childhood mortality, we need more information about the specific causes of mortality at the local level and about the nature of the vulnerability of HIV-exposed but uninfected infants. The authors of the current study provide us with valuable information about the high mortality risk among these infants in Zambia and demonstrate that weaning before 18 months of age is an important and potentially modifiable risk factor [9].

## OBJECTIVES OF THE STUDY

- (1) To Understand the Profile Of HIV Infected Pregnant Female.
- (2) To Study the Risk of Feeding Infants by HIV Positive Mothers.

## METHODOLOGY AND STUDY DESIGN

The study being a retrospective one, has reviewed both the primary and secondary data. Extensive literature review was conducted from multiple secondary data sources like websites of ministries, WHO and journals, magazines and periodicals of various sorts.

Besides, the records of 211 known HIV+ pregnant (who had delivered in the time period from January 2006 to December 2013) in six PPTCT Centers (AIIMS, Safdarjang, LBSH, Pt.Madan Mohan Malviya Nagar Hospital, Kamla Nehru Maternity Centre and SDH) were utilized for the review purpose. Besides, discussions with the PPTCT Counselors and key staff members of the hospitals were initiated for the whole study period.

INSERT TABLE 2 HERE

## ANALYSIS

The data collected from various secondary sources was analyzed and interpreted with the help of simple data presentation techniques like cross-tabulations, Tables, Pie-Charts and Histograms.

## FINDINGS OF THE OBJECTIVES

### To Study the Profile of HIV Infected Mother and their Spouse

This study was carried out in Prevention Of Parent To Child Transmission Department (PPTCT) of obstetrics and gynecology at various Government Hospital, **SafdarjangHospital, AIIMS, LBSH, PT.M M. M., Chacha Nehru and Swami Dayanand Hospital Delhi**. The study conducted over 211 HIV positive pregnant women in various Hospitals and

found out of 211 pregnant women, 180 institution deliveries, 24 home deliveries and 07 women deliveries was not recorded.

INSERT FIGURE 1 HERE

### **MODE OF DELIVERY OF HIV INFECTED WOMEN**

The mode of delivery of infected women mostly depend on the situation and condition of the patients, Guidelines of NACO says vaginal deliveries are more safe for those women on ART, have less Viral Load and CD4 level count is not less than 350. Caesarean deliveries can be effective in preventing the risk of transmission but there is more chance of morbidity as well [10]. INSERT FIGURE 2 HERE.

Labour and delivery management of HIV infected pregnant women should focus on minimizing the risk for both perinatal transmission and the potential for maternal and neonatal complications. Caesarean delivery (elective or scheduled) performed before onset of labour and rupture of membranes has been found to be associated with a significant decrease in perinatal HIV-1 transmission. However, “Non-elective cesarean delivery (performed after onset of labour or rupture of membranes) is not associated with a significant decrease in transmission compared with vaginal delivery” [10].

### **EDUCATION LEVEL OF PREGNANT WOMEN AND THEIR SPOUSE**

The study found that “most of the parents belong to poor family backgrounds” and are less educated. Generally spouse of the women are factory worker. They were not aware about the risk and mode of transmission of HIV.

INSERT FIGURE 3 HERE

### **Spouse HIV status of positive mother**

Husband of the positive mothers were pre tested and post tested counselled. The study found the mode of HIV transmission for all the reported cases was the multiple sexual relationships.

INSERT FIGURE 4 HERE

### **TRANSMISSION THROUGH BREASTFEEDING-RISKS**

Transmission of HIV through breastfeeding has been well documented. The first reports indicating the possibility of HIV-1 transmission through breast milk were of breastfed infants of women who had been

infected postnatally through blood transfusion or through heterosexual exposure. Other reports related to infants with no known exposure to HIV infection other than wet-nursing or pooled breast milk. Where breastfeeding is common and prolonged, transmission through breast milk may account for up to half of the HIV infections in infants and young children [11]. Available Infant feeding antiretroviral prophylaxis interventions can substantially reduce the risk of transmission during pregnancy, labour and delivery but, so far, significant reduction of risk during breastfeeding has been less successful. Research into the prevention of breastfeeding transmission is concerned particularly with modifying breastfeeding practices as a means to prevent HIV transmission, and with the effect of antiretroviral prophylaxis on transmission, including the timing and duration of its administration, whether it is given to the mother or the infant or both; and drug resistance and other health consequences for mothers or infants.

The overall risk of mother-to-child HIV transmission in non-breastfeeding populations is 15-25% (without interventions to reduce transmission) and in breastfeeding populations 20-45%. The risk can be reduced to less than 2% by antiretroviral prophylaxis during gestation, birth and the neonatal period together with elective caesarean section and avoidance of breastfeeding [7]. Subsequent infection through breastfeeding, however, can increase the overall risk at 18-24 months to over 20%. The risk of mother-to-child transmission of HIV is substantially increased by deteriorating maternal health status - high HIV viral load in plasma, a low CD4+ cell count and AIDS - and to a lesser extent by vaginal delivery or prematurity. Recent maternal infection with HIV may raise the risk of transmission through breastfeeding to twice that of a woman with earlier established infection, probably because of the high viral load associated with recent infection. Because breast milk can transmit HIV at any time during lactation, the rate of HIV infection in breastfed infants is cumulative and increases with duration of breastfeeding [11].

### **Mothers Opted for Infant Feeding after counseling Counseling**

INSERT TABLE 3 & FIGURE 5 HERE

The study reviewed the Counseled data of 211 HIV infected delivered mothers in various hospitals about



infant feeding method and their Risks and benefits and found the following:

Out of 211 women 108 mothers had chosen Exclusive Breast Feeding, 58 mothers as Replacement feeding, 03 Mix feeding and 42 Unknown feeding statuses.

### **CAN MOTHER-TO-CHILD HIV TRANSMISSION OCCUR THROUGH BREAST FEEDING**

For an HIV+ woman not being treated for HIV, the chance of passing the virus to her child is about 25% during pregnancy, labor and delivery. If she breastfeeds her infant, there is an additional 12% chance of transmission. Women who received a single dose of Nevirapine to prevent perinatal transmission of HIV-1 had higher rates of virologic failure with subsequent Nevirapine-based antiretroviral therapy than did women without previous exposure to Nevirapine. However, this applied only when Nevirapine-based antiretroviral therapy was initiated within 6 months after receipt of a single, peripartum dose of Nevirapine [3].

### **DISCUSSION**

Mother-to-child transmission of HIV is a global problem. HIV can be transmitted from mother-to child at various stages of pregnancy, *i.e.* ante, intra and post-partum. A number of interventions have therefore been aimed at effectively administering antiretroviral drugs to the mother and to the baby, limiting the risk of newborn infection by elective caesarian section as the mode of delivery and providing alternatives to breastfeeding. However, these approaches are not always possible in developing countries wherein currently 95 per cent of vertical transmission occurs. Several questions and challenges remain, which include choice, availability, affordability, duration, long term safety of optimal antiretroviral agents to be used during pregnancy and early neonatal life to reduce transmission whilst also protecting treatment options to women and children who may need it in future and the issue of transmission via breastfeeds in situations where alternatives to breastfeeding are not available. A wider array of strategies for prevention of mother-to-child transmission of HIV-1 during breastfeeding including passive and active immunization, may offer much needed answers to the problem of continued HIV transmission. Evaluation of efficacy and tolerance of preventive interventions complementary to antiretroviral prophylaxis such as HIV perinatal

vaccine, passive immune prophylaxis, micronutrient supplementation and vaginal-cervical disinfection by means of microbicides should be actively continued and encouraged. The challenge is to find the most cost-effective and feasible intervention to achieve zero per cent transmission of HIV from an infected mother to her child.

Maternity and Child Health services need to pay particular attention to safer delivery practices and counseling and support on infant feeding for women living with HIV. A woman living with HIV may experience many emotional and social problems that affect her health and well-being. These can include concerns about disclosing her HIV status and difficulties in coping with uncertainty about the HIV status of her child. Thus in addition to short- and long-term medical care, women attending MCH services may require psychosocial support. The increasing momentum created by access to treatment and care offers a crucial opportunity for strengthening prevention programmes. The creation of a link between prevention and treatment will increase the uptake of essential prevention services and ensure the long-term sustainability of care, treatment and support services. In addition to the moral and ethical imperatives, it is essential that new HIV infections in infants and adults are prevented to ensure that treatment and care services are not overwhelmed in the long run.

### **ACKNOWLEDGMENTS**

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Table1. Factors that may increase the risk of Vertical Transmission

<b>Pregnancy</b>	<b>Labor and Delivery</b>	<b>Breastfeeding</b>
High maternal plasma viral load (new infection or advanced AIDS)	High maternal plasma and/or genital viral load (new infection or advanced AIDS)	High maternal plasma and/or breast milk viral load (new infection or advanced AIDS)
Viral, bacterial, or parasitic placental infection (e-g. malaria)	Rupture of membranes more than 4 hours before labor begins	Duration of breastfeeding Early mixed feeding (e-g. food or fluids in addition to breast milk Breast abscesses, nipple fissures, and mastitis. Oral disease in the baby (eg, thrush or sores)
Sexually transmitted infections (STIs)	Vaginal delivery Invasive delivery procedures that increase contact with mother's infected blood or body fluids (eg, episiotomy, fetal scalp monitoring) First infant in multiple birth Chorioamnionitis (from untreated STI or other infection)	

Table 2: Records Reviewed of the following number of patients from different hospitals of Delhi NCR

<b>Hospital</b>	<b>No. of Patients</b>
SAFDARJANG HOSPITAL	87
AIIMS SDN HOSPITAL	6 81
LBS HOSPITAL	18
SDN HOSPITAL	6
K.N.M.CENTRE	10
PT.M.M.M.HOSPITAL	9
TOTAL	211

Table 3: Feeding method adopted

BREAST FEEDING	REPLACEMENT FEEDING	MIX FEEDING	UNKNOWN
108	58	03	42

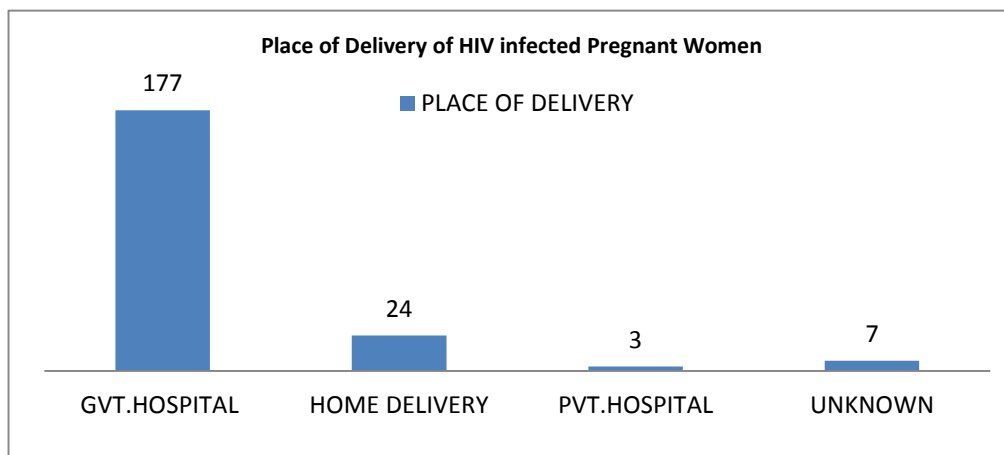


Figure 1: Places of delivery of HIV infected women

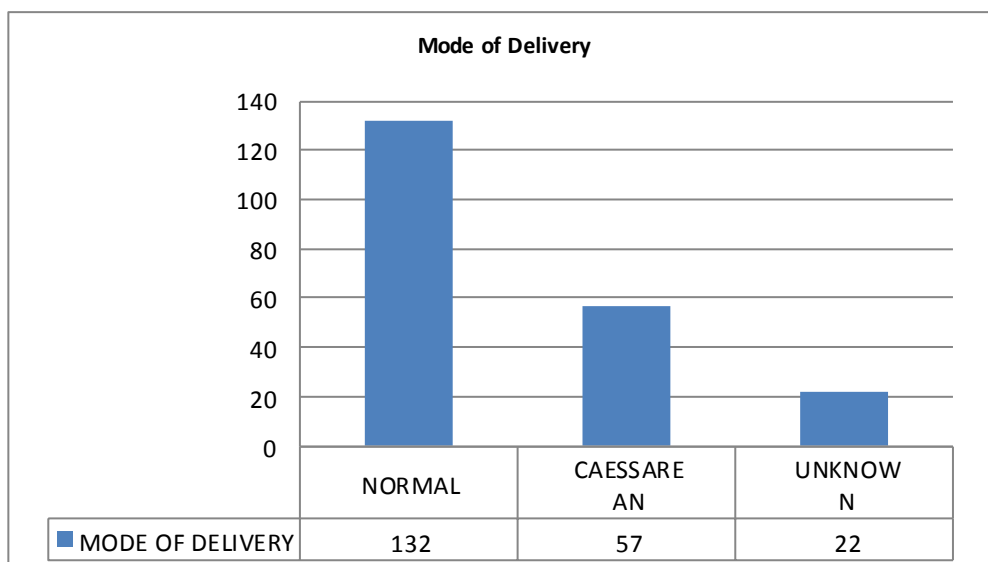


Figure 2: Mode of Delivery of the Sample women

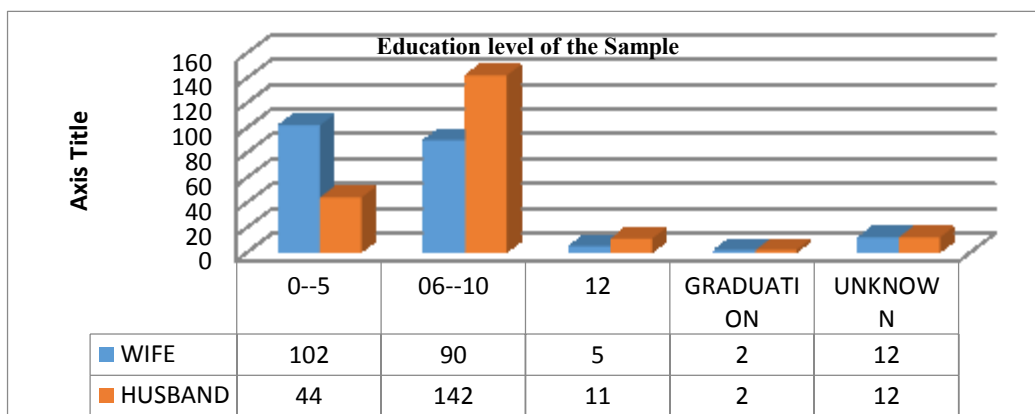


Figure 3: Education Level of the Sample



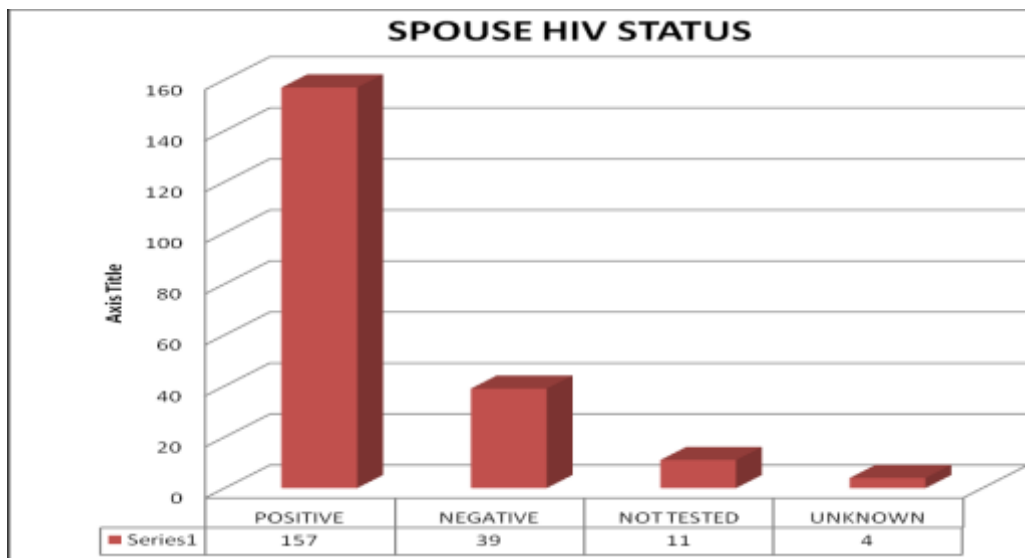


Figure 4: HIV status of spouse

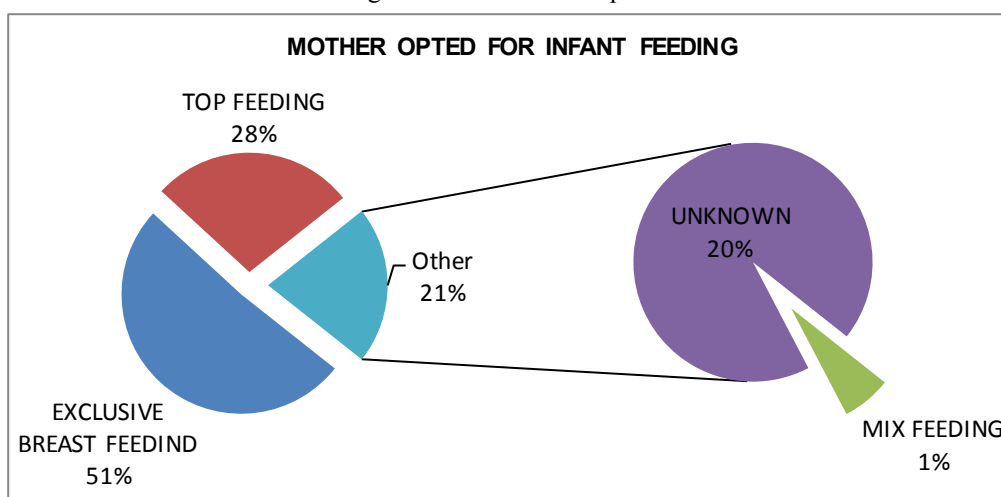


Figure 5: Feeding method opted (in percentage)